

MEMORANDUM FOR SUPERINTENDENT

YOSEMITE NATIONAL PARK

INSECT CONDITIONS WITHIN THE PARK

AND RECOMMENDATIONS FOR FISCAL YEAR 1932

by

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MEMORANDUM FOR SUPERINTENDENT
YOSEMITE NATIONAL PARK

Insect Conditions Within the Park
and Recommendations for Fiscal Year 1932

Introduction

A general reconnaissance survey of Yosemite National Park was made during the period of August 17-23, 1931. Its purpose was to ascertain the effects of the control work carried on in Yosemite Valley, Big Meadows and Wawona Road Strip Units during the spring of 1931, to ascertain the intensities and trends of the insect infestations within the Park and to gather data to form the basis for recommendations concerning the treatment to be given the infestations in the several units, should treatment be considered necessary.

Conditions of Infestation

Western Yellow Pine. Conditions of infestation in the western yellow pine belt are extremely unstable at the present time; and for that reason, as well as because the attack that will furnish the 1931 winter brood has scarcely begun, it is impossible to estimate with any certainty the total losses that will be sustained this year. The general tendencies shown by the infestation in the yellow pine belt in Yosemite National Park and in adjacent areas distinctly indicate increases in losses caused by the western pine beetle (Dendroctonus brevicornis Lec.). The summer-brood losses of 1930 were scarcely abnormal in those areas, but the 1930 winter-brood losses showed increases of as high as 300% over those of the summer brood. The summer-brood losses of 1931, which are now apparent, show additional increases and tendencies to attack young thrifty trees and to kill large groups.

These increases and this form of infestation are typical of those that have occurred during the past year or two in more southern areas of the same altitudinal belt of timber. The effects of the infestation in those areas have been severe. Large groups of dead trees remain; and, from a park standpoint, such losses would result in the destruction of scenic values for some time to come. There is no reason to believe that the course of the infestation in the park will be different from that followed in areas in which the epidemic is more advanced. Accordingly, recommendations made in this memorandum are based upon the expectation that the infestation within the park will follow the same general course, and the advisability of adhering to these recommendations will be affected by deviations from that course. Supplementary examinations of the stands in the western yellow pine belt after the 1931 winter-brood losses have become apparent will be absolutely necessary as a basis for action.

Sugar Pine. Losses in sugar pine caused by the mountain pine beetle (Dendroctonus monticolae Hopk.) show a distinct increase over those of last year. As is usual with infestation in sugar pine, no large groups of trees were killed, although as many as four trees were seen in several groups, and two-tree groups were common. The complete 1931 loss in sugar pine is not yet entirely apparent, as many trees were just beginning to fade at the time the examination was made. It is not probable that the losses in sugar pine will leave as noticeable scars on the landscape as are to be expected from the present infestation in yellow pine; but the drain on the stand of sugar pine, particularly those within sight of traveled roads or in areas of intensive use, is more than sufficient at the present time to result in the killing of the greater portion of the majestic mature trees over a period of years.

Control of the insects infesting sugar pine over the extensive areas in which this tree is an integral part of the forest cover is impossible to consider because of the scattered nature of the infestation, the large average size of the trees and the resultant high cost of control. Efforts should be made, however, to apply control measures to trees of this species in all areas of intensive use and along main traveled roads, for it is to be expected that this type of control will result in a marked reduction of losses in those areas.

Jeffrey Pine. Many of the areas in which Jeffrey pine is an important part of the forest cover are relatively free of insect-killed trees. The infestation caused by the Jeffrey pine beetle (Dendroctonus jeffreyi Hopk.) in other areas shows no marked tendency to increase, but appears to be continuing at a steady rate that is resulting in the loss of a small number of trees each year. The Cottonwood Creek infestation, which will be discussed later, is of this type, although the number of trees infested in that small area is much larger than has been found in any other area within the park.

Lodgepole Pine. No centers of infestation indicating a tendency to increase, or approaching epidemic conditions, were found in any of the lodgepole stands examined. Attacks by the mountain pine beetle (Dendroctonus monticolae Hopk.), however, are apparently widespread, and groups of from one to five infested trees were present throughout all the stands seen. Few trees containing a heavy brood or attack are to be found; and in the majority of cases it was evident that it often took two years for the insects to overcome a single tree. They attack and kill a portion, usually one side of the trunk, in one season, and complete the damage the following year. This type of infestation, although resulting in no large groups of trees containing brood, leads to the formation of groups of dead trees when the attack is continued over a period of years. Although this type of infestation is not desirable to consider for control from an entomological standpoint, it may be considered as a problem in control and clean-up from the park standpoint. The loss, although not great in any one year, results in undesirable conditions within the stands, particularly those along traveled roads, for the numerous groups of dead trees are unsightly and the resultant effect upon the scenic values of the lodgepole stands is worthy of consideration.

Fir, White and Red. Losses in firs from attacks by the fir engraver beetle (*Scolytus ventralis* Lec.) are general throughout the stands containing fir, but no areas were seen in which the infestation resulted in the death of groups of trees. One such group was reported by Ranger Naturalist Anderson to be present in the back country along the Buck Camp trail, but no examination was made, as it is in a portion of the park that is not accessible to the ordinary tourist. The losses caused by this beetle were in no case found to be above those that are to be expected in the fir stands, and in no case was it deemed advisable to consider any measures of control other than that which should be applied in areas of intensive use.

California Black Oak. Injury to the twigs of these trees by the oak twig girdler is becoming noticeable on the floor of Yosemite Valley. At the present time the insects are in the young larval stage and only the terminal two or three inches of the twigs have been attacked, resulting in fading of a few leaves on the twigs. It is to be expected that these insects will continue their burrows in the twigs, and that the groups of faded leaves will become larger and more noticeable in the future.

Infestations of Importance

Yosemite Valley Floor and Lower Merced Canyon. This area may be designated as one of intensive use and, according to the Insect Control Policy for National Parks, prepared by the National Park Service and approved by the Director on May 6, 1931, should be fully protected from insect losses.

Control work was carried on in this area during the spring of 1931, 63 yellow pine, 1 sugar pine and 7 fir being treated. The insects concerned were the western pine beetle, mountain pine beetle and fir engraver beetle. The effects of this control work are shown by the presence of only one large group (36) of summer-brood trees in the area, whereas other untreated areas in the same general region show many more groups typical of epidemic conditions. It is evident, however, that the infestation in this unit, as well as in other similar units in the same region, is on the upgrade. The control work carried on was but a temporary setback to the infestation, and more work will evidently be needed as long as conditions favoring an epidemic infestation exist. It is recommended that control work in this unit be carried on in the fall of 1931 and the spring of 1932, and that a definite policy of maintenance control that will provide for the cutting, burning of bark and utilization of wood of trees containing brood be put into effect. Such a policy is essential if the relatively few mature yellow pine in the valley are to be protected from the beetles that normally attack mature trees rather than the smaller, thrifty, immature types.

Wawona Road Strip. Control operations were also carried on in this unit during the spring of 1931. That portion of the unit north of Chinquapin Ranger Station was not entirely cleared of infested trees, due to lack of time and available funds, but the area south of the ranger station was given complete treatment. In the area south of the ranger station but two summer-brood groups of infested western yellow pine typical of the present epidemic have appeared since the control work. In the partially treated area north of the ranger station five such groups were seen. In addition to these groups there are scattered individual trees that form a heavy endemic type of infestation. Losses in sugar pine are heavier than normal in the entire unit.

It is evident, when the treated areas of the Wawona Road Strip are compared with similar untreated areas, that control work has reduced considerably the intensity of the infestation. However, as conditions favorable to an epidemic apparently remain in force, there is a tendency for the infestation in the control areas to increase again. It is notable that the area in which a complete clean-up was secured failed to show any of the groups typical of the present epidemic except in a part adjacent to an area where only partial control was secured. That portion of the unit in which only partial control was secured, however, shows an infestation that has been much less reduced in intensity and is more like untreated areas.

This road strip is considered to be of great value as a screen also an epidemic infestation in the northern portion of the area, if allowed to continue uncontrolled, is a danger threatening the stands in Yosemite Valley. Because of these two factors it is recommended that operations aimed at the control of the western pine beetle in western yellow pine and the mountain pine beetle in sugar pine be carried on in the fall of 1931 and the spring of 1932 in the entire unit comprising the Wawona Road Strip.

Mariposa Grove of Big Trees. This area is to be considered one of intensive use and accordingly should be given full protection from injurious forest insects. The insect causing the more important losses in this area is the mountain pine beetle attacking sugar pine, although the western pine beetle is now attacking the western yellow pine fringe of timber surrounding the more important sugar pine, fir, big tree type of stand.

The 1931 losses in sugar pine are sufficient to be objectionable, and if the same rate of increase continues as occurred during the past year, the results will be deplorable. It is recommended that the intensively-used portions of this grove be subjected to an annual maintenance control program in the future, and that special attention be given to cleaning up the infestation in sugar pine this year.

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Big Meadows. This unit was subjected to partial control during the spring of 1931; but it is evident that, although a definite setback was given the infestation by the work, the infestation has again started on the upgrade. This tendency, however, is much less pronounced than in nearby basins of a similar type in which no control work was done. It cannot be said that epidemic conditions existed in the Big Meadows basin at the time of the examination; but if the increase that has taken place since the control work was completed continues through the attacks of the 1931-winter brood, there is little doubt that the infestation will be of serious proportions.

This area, as mentioned in a previous report, is not an area of intensive use, nor is it one of particular scenic value; although the new Wawona road, which is in process of construction, will add materially to its value, as the basin will be in full view of travelers on the road. Entomologically, however, this area should be considered as the main source from which a spread of beetles into Yosemite Valley could occur, and thus is of considerable importance. Accordingly it is suggested that if further examination of the area in the fall of 1931, after the 1931 winter-brood losses have become apparent, shows the winter-brood losses to have reached epidemic proportions, as shown by the typical grouping of infested trees and by a sufficiently large number of brood trees, control operations should be initiated during the latter part of this season and completed as soon as possible. The rapid recovery of the infestation in this area, as well as in that portion of the Wawona Road Strip in which only partial control measures were applied, has definitely shown the relative ineffectiveness of control of only a portion of the brood. It would be more efficient, if funds and time were not available to treat all the areas necessitating attention in a thorough manner, to select a few of the more important areas for thorough treatment and sacrifice those of lesser importance, rather than attempt to cover all the areas with partial treatment.

Rockefeller Purchase Area. This area, which lies north of Gin Flat and the Tuolumne Grove of Big Trees, and extends northward towards Bald Mountain, is an area of considerable value because of the money invested in the fine stand of yellow pine, sugar pine and fir that forms the forest cover.

The cruise of 1930 showed relatively little infestation in the entire basin east of Crocker Ridge, part of which is the purchase area referred to. The examination of 1931, however, showed that the summer brood had caused important losses and had assumed the characteristics of an epidemic infestation. The greater portion of the basin, as well as a considerable portion of the purchase area, lies within the altitudinal belt of timber on the west slope of the Sierras in which extremely heavy losses have occurred during the past year or more.

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The increase in losses in this basin apparently indicates that the infestation is following the trends of similar adjacent areas. If the upward trend continues epidemic conditions will soon exist, and it is to be expected that the heavy losses suffered by Anderson Flat and Deer Flat, two nearby areas of the same general type, will be sustained in the future by the basin of which the purchase area is a part. At the time of the examination but a few small groups of summer-brood-infested western yellow pine were visible within the park boundary, although relatively heavy losses in sugar pine were seen. Groups of infested yellow pine trees, typical of an epidemic infestation, were found within one hundred yards of the park boundary, however, and there is no apparent reason why a heavy 1931-winter-brood loss should not be suffered throughout the basin. An examination during the late fall of this year is necessary in order to determine if the present tendencies toward epidemic conditions are shown by the infestation of the winter brood of the western pine beetle. If the expected increases occur it is recommended that control methods be applied to this area.

Cottonwood Creek. The infestation of Jeffrey pine in this area is apparently continuing at the same rate. Eighty-six infested trees were found in the 1930 cruise, of which approximately forty were killed in 1930. The remainder were strip killed, but have been reinfested in 1931 and will probably succumb. In addition, seventy-one new trees were found in which 1931 attacks of varying intensity occurred. Undoubtedly a portion of these will be killed in 1931, but the greater number will be strip-killed and will not die this season.

In view of the value of the forest cover if the projected road through the area is constructed, it is again recommended that this small center of infestation be subjected to control operations.

Notes on Other Areas. Illilouette basin, Little Yosemite and Yosemite Creek basin have suffered relatively light insect losses, and it is not expected that any regulatory measures will be required. The situation in the lodgepole stands along Glacier Point Road and the Tioga Road has already been discussed. Clean-up in these areas, however, could not be recommended upon a strictly entomological basis.

Summary

1. The infestation in the western yellow pine belt of timber, which includes the stands along the western boundary of Yosemite National Park, is increasing, and in untreated areas adjacent to the park has reached epidemic proportions.

2. The park areas affected by the infestation in western yellow pine are Yosemite Valley, Wawona Road Strip, Big Meadows and Rockefeller Purchase Units.

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3. The control work carried on by the Park Service during the spring of 1931 was effective in temporarily checking the progress of the infestation. Where complete treatment was given the infestation was broken up but is recovering, and the summer-brood losses showed the tendency to increase. Where only partial treatment was given a much less effective setback was secured and the infestations have recovered more rapidly.

4. Jeffrey pine infestations continued this year at about the same rate as last. The Cottonwood Creek area was the only one seen in which alarming conditions occurred.

5. The infestation in sugar pine has increased, and control for this type of infestation is warranted in the Mariposa Grove.

6. The infestation in lodgepole pine has decreased slightly, but the slow, steady losses are building up relatively large groups of dead trees that are having a marked effect upon the scenic values of the lodgepole areas.

Recommendations and Estimates

1. The data forming the basis for these recommendations were gathered too early in the season to take into consideration the winter-brood losses of 1931.

2. The advisability of control work in the areas for which it is recommended in this report will depend largely upon the intensity of the infestation by the winter brood of 1931.

3. It will be absolutely necessary that a reappraisal of conditions be made after winter-brood losses have become apparent, preferably in October, in the areas where control work is proposed. Final recommendations for control should be based upon the conditions found at the time of that examination.

4. Definite maintenance control programs should be formulated for the Yosemite Valley Unit and the Mariposa Grove of Big Trees. These two areas of intensive use require full protection from insect depredations if the values afforded by the western yellow pine and sugar pine trees on those areas are to be retained. Continuous vigilance and treatment of infested trees is necessary. The accessibility of these two areas and the demands for firewood make maintenance control programs practical and desirable.

5. The extent of the areas in which control work will apparently be necessary and the necessity for training personnel make it advisable to utilize all the time available for control operations. It is suggested that operations be started in the fall of 1931, as soon as final decisions concerning the advisability of control are made, and be continued as late into the winter season as practical. Work should start again as early in the spring as possible, and plans should be made to treat those areas in which emergence of the winter brood will first occur, during the early part of the control season.

6. Using the data furnished by attacks of the summer brood as a basis, and assuming that the infestations will follow the same trends as in similar nearby areas, it is recommended that the infestations in western yellow pine and sugar pine in the Wawona Road Strip, the Big Meadows Unit and the Rockefeller Purchase Area be subjected to control measures. It is also recommended that the infestation in Jeffrey pine in the Cottonwood Creek area be treated. These recommendations are in addition to those concerning maintenance control in the Yosemite Valley Unit and the Mariposa Grove of Big Trees.

7. Estimates as to the cost of the work recommended above are as follows:

Yosemite Valley Unit - - - - -	\$750.
Mariposa Grove of Big Trees - -	150.
Wawona Road Strip- - - - -	2,500.
Big Meadows Unit- - - - -	2,000.
Rockefeller Purchase Area- -	1,500.
Cottonwood Cr. Infestation- -	200.
Total -	<u>\$7,100.</u>

These figures are based upon a tentative estimate as to the number of winter-brood trees that will be found, the accessibility of the trees and their size. If unexpected changes in the infestation occur it will be necessary to modify these estimates.